

SEQUENCE LISTING

<110> Nam, Jae-Hwan
Bukh, Jens
Emerson, Suzanne
Purcell, Robert

<120> HCV/BVDV Chimeric Genomes and Uses Thereof

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Ala Ala Leu Val Val Ala Gln Leu Leu Arg Ile Pro Gln Ala Ile Met
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Asp Met Ile Ala Gly Ala His Trp Gly Val Leu Ala Gly Ile Ala Tyr
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Phe Ser Met Val Gly Asn Trp Ala Lys Val Leu Val Val Leu Leu Leu
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Phe Ala Gly Val Asp Ala Glu Thr His Val Thr Gly Gly Asn Ala Gly
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Arg Thr Thr Ala Gly Leu Val Gly Leu Leu Thr Pro Gly Ala Lys Gln
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Asn Ile Gln Leu Ile Asn Thr Asn Gly Ser Trp His Ile Asn Ser Thr
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Ala Leu Asn Cys Asn Glu Ser Leu Asn Thr Gly Trp Leu Ala Gly Leu
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Phe Tyr Gln His Lys Phe Asn Ser Ser Gly Cys Pro Glu Arg Leu Ala
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Ser Cys Arg Arg Leu Thr Asp Phe Ala Gln Gly Trp Gly Pro Ile Ser
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Tyr Ala Asn Gly Ser Gly Leu Asp Glu Arg Pro Tyr Cys Trp His Tyr
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Pro Pro Arg Pro Cys Gly Ile Val Pro Ala Lys Ser Val Cys Gly Pro
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Val Tyr Cys Phe Thr Pro Ser Pro Val Val Val Gly Thr Thr Asp Arg
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Ser Gly Ala Pro Thr Tyr Ser Trp Gly Ala Asn Asp Thr Asp Val Phe
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Trp Met Asn Ser Thr Gly Phe Thr Lys Val Cys Gly Ala Pro Pro Cys
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Asp Val Gln Tyr Leu Tyr Gly Val Gly Ser Ser Ile Ala Ser Trp Ala
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Ile Lys Trp Glu Tyr Val Val Leu Leu Phe Leu Leu Ala Asp Ala
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Arg Val Cys Ser Cys Leu Trp Met Met Leu Leu Ile Ser Gln Ala Glu
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Ala Ile Gln Tyr Gly Ser Gly Glu Val Val Met Met Gly Asn Leu Leu
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Thr His Asn Asn Ile Glu Val Val Thr Tyr Phe Leu Leu Leu Tyr Leu
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Leu Leu Arg Glu Glu Ser Val Lys Lys Trp Val Leu Leu Leu Tyr His
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Lys Ile Asp Leu Cys Phe Thr Thr Val Val Leu Ile Val Ile Gly Leu
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Tyr Leu Leu Ser Gly Arg Leu Arg Asn Leu Ile Ile Lys His Lys Val
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Arg Asn Glu Thr Val Ala Ser Trp Tyr Gly Glu Glu Glu Val Tyr Gly
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Arg His Cys Ile Ile Cys Thr Val Cys Glu Gly Arg Glu Trp Lys Gly
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Gly Thr Cys Pro Lys Cys Gly Arg His Gly Lys Pro Ile Thr Cys Gly
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Ser Pro Asp Thr His Arg Val Pro Cys His Ile Ser Phe Gly Ser Arg
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Met Pro Phe Arg Gln Glu Tyr Asn Gly Phe Val Gln Tyr Thr Ala Arg
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Met Arg Leu Lys His Pro Ser Ile Ser Phe Asn Leu Arg Ile Gly Asp
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Met Lys Glu Gly Asp Met Ala Thr Gly Ile Thr Tyr Ala Ser Tyr Gly
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Tyr Phe Cys Gln Met Pro Gln Pro Lys Leu Arg Ala Ala Met Val Glu
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Tyr Ser Tyr Ile Phe Leu Asp Glu Tyr His Cys Ala Thr Pro Glu Gln
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Leu Ala Ile Ile Gly Lys Ile His Arg Phe Ser Glu Ser Ile Arg Val
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Val Ala Met Thr Ala Thr Pro Ala Gly Ser Val Thr Thr Thr Gly Gln
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Lys His Pro Ile Glu Glu Phe Ile Ala Pro Glu Val Met Lys Gly Glu
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Asp Leu Gly Ser Gln Phe Leu Asp Ile Ala Gly Leu Lys Ile Pro Val
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Asp Glu Met Lys Gly Asn Met Leu Val Phe Val Pro Thr Arg Asn Met
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<400> 4

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					20				25					30		
Gly	Val	Tyr	Leu	Leu	Pro	Arg	Arg	Gly	Pro	Arg	Leu	Gly	Val	Arg	Ala	
					35				40					45		
Thr	Arg	Lys	Thr	Ser	Glu	Arg	Ser	Gln	Pro	Arg	Gly	Arg	Arg	Gln	Pro	
					50				55					60		
Ile	Pro	Lys	Asp	Arg	Arg	Ser	Thr	Gly	Lys	Ser	Trp	Gly	Lys	Pro	Gly	
					65				70					75		80
Tyr	Pro	Trp	Pro	Leu	Tyr	Gly	Asn	Glu	Gly	Leu	Gly	Trp	Ala	Gly	Trp	
					85				90					95		

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Gly Gly Val Ala Arg Ala Leu Ala His Gly Val Arg Val Leu Glu Asp
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Gly Val Asn Phe Ala Thr Gly Asn Leu Pro Gly Cys Ser Phe Ser Ile
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Phe Leu Leu Ala Leu Leu Ser Cys Ile Thr Thr Pro Val Ser Ala Ala
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Asp Met Met Met Asn Trp Ser Pro Thr Ala Thr Met Ile Leu Ala Tyr
325 330 335

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Glu His Arg Leu Thr Ala Ala Cys Asn Phe Thr Arg Gly Asp Arg Cys
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Glu Lys Leu Val Ile Leu His Ala Ala Ser Ala Ala Ser Cys Asn Gly
755 760 765

Phe Leu Tyr Phe Val Ile Phe Phe Val Ala Ala Trp Tyr Ile Lys Gly
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Arg Val Val Pro Leu Ala Thr Tyr Ser Leu Thr Gly Leu Trp Ser Phe
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Ser Leu Leu Leu Leu Ala Leu Pro Gln Gln Ala Tyr Ala Tyr Asp Ala
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Ser Val His Gly Gln Ile Gly Ala Ala Leu Leu Val Met Ile Thr Leu
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Phe Thr Leu Thr Pro Gly Tyr Lys Thr Leu Leu Ser Arg Phe Leu Trp
835 840 845

Trp Leu Cys Tyr Leu Leu Thr Leu Gly Glu Ala Met Val Gln Glu Trp
850 855 860

Ala Pro Pro Met Gln Val Arg Gly Gly Arg Asp Gly Ile Ile Trp Ala
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Val Ala Ile Phe Tyr Pro Gly Val Val Phe Asp Ile Thr Lys Trp Leu
885 890 895

Leu Ala Val Leu Gly Pro Ala Tyr Leu Leu Lys Gly Ala Leu Thr Arg
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Val Pro Tyr Phe Val Arg Ala His Ala Leu Leu Arg Met Cys Thr Met
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Ala Arg His Leu Ala Gly Gly Arg Tyr Val Gln Met Ala Leu Leu Ala
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Leu Gly Arg Trp Thr Gly Thr Tyr Ile Tyr Asp His Leu Thr Pro Met
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1680

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1690

1695

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Lys Gln Ala Gln Asp Ile Gln Pro Thr Val Gln Ala Ser Trp Pro Lys

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Ser Met Met Ala Phe Ser Ala Ala Leu Thr Ser Pro Leu Ser Thr Ser

1795

1800

1805

Thr Thr Ile Leu Leu Asn Ile Leu Gly Gly Trp Leu Ala Ser Gln Ile

1810

1815

1820

Ala Pro Pro Ala Gly Ala Thr Gly Phe Val Val Ser Gly Leu Val Gly

1825

1830

1835

1840

Ala Ala Val Gly Ser Ile Gly Leu Gly Lys Val Leu Val Asp Ile Leu

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1855

Ala Gly Tyr Gly Ala Gly Ile Ser Gly Ala Leu Val Ala Phe Lys Ile

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1865

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Met Ser Gly Glu Lys Pro Ser Met Glu Asp Val Val Asn Leu Leu Pro

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1880

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Pro Ile Asn Cys Tyr Thr Glu Gly Gln Cys Val Pro Lys Pro Ala Pro
2065 2070 2075 2080

Asn Phe Lys Val Ala Ile Trp Arg Val Ala Ala Ser Glu Tyr Ala Glu
2085 2090 2095

Val Thr Gln His Gly Ser Tyr His Tyr Ile Thr Gly Leu Thr Thr Asp
2100 2105 2110

Asn Leu Lys Val Pro Cys Gln Leu Pro Ser Pro Glu Phe Phe Ser Trp
2115 2120 2125

Val Asp Gly Val Gln Ile His Arg Phe Ala Pro Thr Pro Lys Pro Phe
2130 2135 2140

Phe Arg Asp Glu Val Ser Phe Cys Val Gly Leu Asn Ser Phe Val Val
2145 2150 2155 2160

Gly Ser Gln Leu Pro Cys Asp Pro Glu Pro Asp Thr Asp Val Leu Met
2165 2170 2175

Ser Met Leu Thr Asp Pro Ser His Ile Thr Ala Glu Thr Ala Ala Arg
2180 2185 2190

Arg Leu Ala Arg Gly Ser Pro Pro Ser Glu Ala Ser Ser Ser Ala Ser
2195 2200 2205

Gln Leu Ser Ala Pro Ser Leu Arg Ala Thr Cys Thr Thr His Gly Lys
2210 2215 2220

Ala Tyr Asp Val Asp Met Val Asp Ala Asn Leu Phe Met Gly Gly Asp
2225 2230 2235 2240

Val Thr Arg Ile Glu Ser Gly Ser Lys Val Val Val Leu Asp Ser Leu
2245 2250 2255

Asp Pro Met Val Glu Glu Arg Ser Asp Leu Glu Pro Ser Ile Pro Ser
2260 2265 2270

Glu Tyr Met Leu Pro Lys Lys Arg Phe Pro Pro Ala Leu Pro Ala Trp
2275 2280 2285

Ala Arg Pro Asp Tyr Asn Pro Pro Leu Val Glu Ser Trp Lys Arg Pro
2290 2295 2300

Asp Tyr Gln Pro Ala Thr Val Ala Gly Cys Ala Leu Pro Pro Pro Arg
2305 2310 2315 2320

Lys Thr Pro Thr Pro Pro Arg Arg Arg Arg Thr Val Gly Leu Ser
2325 2330 2335

Glu Asp Ser Ile Gly Asp Ala Leu Gln Gln Leu Ala Ile Lys Ser Phe
2340 2345 2350

Gly Gln Pro Pro Pro Ser Gly Asp Ser Gly Leu Ser Thr Gly Ala Gly
2355 2360 2365

Ala Ala Asp Ser Gly Ser Gln Thr Pro Pro Asp Glu Leu Ala Leu Ser
2370 2375 2380

Glu Thr Gly Ser Ile Ser Ser Met Pro Pro Leu Glu Gly Glu Leu Gly
2385 2390 2395 2400

Asp Pro Asp Leu Glu Pro Glu Gln Val Glu Pro Gln Pro Pro Pro Gln
2405 2410 2415

Gly Gly Val Ala Ala Pro Gly Ser Asp Ser Gly Ser Trp Ser Thr Cys
2420 2425 2430

Ser Glu Glu Asp Asp Ser Val Val Cys Cys Ser Met Ser Tyr Ser Trp
2435 2440 2445

Thr Gly Ala Leu Ile Thr Pro Cys Ser Pro Glu Glu Lys Leu Pro
2450 2455 2460

Ile Asn Pro Leu Ser Asn Ser Leu Leu Arg Tyr His Asn Lys Val Tyr
2465 2470 2475 2480

Cys Thr Thr Lys Ser Ala Ser Leu Arg Ala Lys Lys Val Thr Phe
2485 2490 2495

Asp Arg Met Gln Val Leu Asp Ser Tyr Tyr Asp Ser Val Leu Lys Asp
2500 2505 2510

Ile Lys Leu Ala Ala Ser Lys Val Thr Ala Arg Leu Leu Thr Met Glu
2515 2520 2525

Glu Ala Cys Gln Leu Thr Pro Pro His Ser Ala Arg Ser Lys Tyr Gly
2530 2535 2540

Phe Gly Ala Lys Glu Val Arg Ser Leu Ser Gly Arg Ala Val Asn His
2545 2550 2555 2560

Ile Lys Ser Val Trp Lys Asp Leu Leu Glu Asp Ser Glu Thr Pro Ile
2565 2570 2575

Pro Thr Thr Ile Met Ala Lys Asn Glu Val Phe Cys Val Asp Pro Thr
2580 2585 2590

Lys Gly Lys Lys Ala Ala Arg Leu Ile Val Tyr Pro Asp Leu Gly
2595 2600 2605

Val Arg Val Cys Glu Lys Met Ala Leu Tyr Asp Ile Thr Gln Lys Leu
2610 2615 2620

Pro Gln Ala Val Met Gly Ala Ser Tyr Gly Phe Gln Tyr Ser Pro Ala
2625 2630 2635 2640

Gln Arg Val Glu Phe Leu Leu Lys Ala Trp Ala Glu Lys Lys Asp Pro
2645 2650 2655

Met Gly Phe Ser Tyr Asp Thr Arg Cys Phe Asp Ser Thr Val Thr Glu
2660 2665 2670

Arg Asp Ile Arg Thr Glu Glu Ser Ile Tyr Arg Ala Cys Ser Leu Pro
2675 2680 2685

Glu Glu Ala His Thr Ala Ile His Ser Leu Thr Glu Arg Leu Tyr Val
2690 2695 2700

Gly Gly Pro Met Phe Asn Ser Lys Gly Gln Thr Cys Gly Tyr Arg Arg
2705 2710 2715 2720

Cys Arg Ala Ser Gly Val Leu Thr Thr Ser Met Gly Asn Thr Ile Thr
2725 2730 2735

Cys Tyr Val Lys Ala Leu Ala Ala Cys Lys Ala Ala Gly Ile Ile Ala
2740 2745 2750

Pro Thr Met Leu Val Cys Gly Asp Asp Leu Val Val Ile Ser Glu Ser
2755 2760 2765

Gln Gly Thr Glu Glu Asp Glu Arg Asn Leu Arg Ala Phe Thr Glu Ala
2770 2775 2780

Met Thr Arg Tyr Ser Ala Pro Pro Gly Asp Pro Pro Arg Pro Glu Tyr
2785 2790 2795 2800

Asp Leu Glu Leu Ile Thr Ser Cys Ser Ser Asn Val Ser Val Ala Leu
2805 2810 2815

Gly Pro Gln Gly Arg Arg Arg Tyr Tyr Leu Thr Arg Asp Pro Thr Thr
2820 2825 2830

Pro Ile Ala Arg Ala Ala Trp Glu Thr Val Arg His Ser Pro Val Asn
2835 2840 2845

Ser Trp Leu Gly Asn Ile Ile Gln Tyr Ala Pro Thr Ile Trp Ala Arg
2850 2855 2860

Met Val Leu Met Thr His Phe Phe Ser Ile Leu Met Ala Gln Asp Thr
2865 2870 2875 2880

Leu Asp Gln Asn Leu Asn Phe Glu Met Tyr Gly Ala Val Tyr Ser Val
2885 2890 2895

Ser Pro Leu Asp Leu Pro Ala Ile Ile Glu Arg Leu His Gly Leu Asp
2900 2905 2910

Ala Phe Ser Leu His Thr Tyr Thr Pro His Glu Leu Thr Arg Val Ala
2915 2920 2925

Ser Ala Leu Arg Lys Leu Gly Ala Pro Pro Leu Arg Ala Trp Lys Ser
2930 2935 2940

Arg Ala Arg Ala Val Arg Ala Ser Leu Ile Ser Arg Gly Gly Arg Ala
2945 2950 2955 2960

Ala Val Cys Gly Arg Tyr Leu Phe Asn Trp Ala Val Lys Thr Lys Leu
2965 2970 2975

Lys Leu Thr Pro Leu Pro Glu Ala Arg Leu Leu Asp Leu Ser Ser Trp
2980 2985 2990

Phe Thr Val Gly Ala Gly Gly Asp Ile Tyr His Ser Val Ser Arg
2995 3000 3005

Ala Arg Pro Arg Leu Leu Phe Gly Leu Leu Leu Leu Phe Val Gly
3010 3015 3020

Val Gly Leu Phe Leu Leu Pro Ala Arg
3025 3030